

**REMARKS**

A Petition for Extension of Time is being concurrently filed with this Amendment. Thus, this Amendment is being timely filed.

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the claims and the following remarks.

***Status of the Claims***

In the present Amendment, claims 15-16 have been added. Claims 13 and 14 were previously canceled without prejudice or disclaimer of the subject matter contained therein. Also, claims 2-9 and 11-12 are withdrawn from consideration. Thus, claims 1-12 and 15-16 are pending in this application.

No new matter has been added with these new claims. Support for new claims 15-16 can be found at least at page 31, lines 1-2 and in Table 2 (Ex. 3) at page 170 of the present specification.

Based upon the above considerations, entry of the present amendment is respectfully requested.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw the only rejection and allow the currently pending claims.

***Issues under 35 U.S.C. § 103(a)***

Claims 1 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kawai *et al.* '687 (EP 1 138 687) (see paragraphs 2-4 of the Office Action). Applicants

respectfully traverse, and reconsideration and allowance of all of the pending claims is respectfully requested based on the following remarks.

Comments in Office Action

In paragraph 4 of the Office Action, the Examiner states that the metallocene catalyst used to prepare the copolymer of Comparative Example 3 is not included in the catalyst composition of the cited Kawai *et al.* '687 reference. Thus, the Examiner states that Comparative Example 3 of the present specification is not representative of Kawai *et al.*, and that a comparison to the closest prior art example has not been shown. In response, Applicants note the discussion below, including the two depicted tables.

Kawai *et al.* '687 Versus the Present Invention

The cited Kawai *et al.* '687 reference discloses the preparation of a propylene/1-butene copolymer having a melting point of 73.6°C and an intrinsic viscosity of 0.94 dl/g in the presence of a metallocene catalyst in Example 38 at page 237. However, Kawai *et al.* '687 fails to disclose the propylene/1-butene random copolymer having a melting point of less than 73.6°C as well as having a crystallization rate (1/2 crystallization time) at 45°C of 10 minutes or less in the range of the melting point from 40 to 66.5°C as recited in presently pending claim 1. These are major deficiencies of Kawai *et al.* '687.

Still, the Examiner contends that as the amount of butene monomer increases in the reaction media the amount of butene incorporated in the propylene copolymer increases, and that the regularity and the length of propylene blocks in the copolymer decreases (see paragraph

3 at page 3, lines 1-6 of the Office Action). The Examiner thus concludes that the  $T_m$  controlled by the regularity of propylene blocks in the copolymer decreases based on Examples 37-42 in Kawai *et al.* '687.

In response, Applicants respectfully point out that Kawai *et al.* '687 fails to disclose all claimed features, which includes the instantly claimed the propylene/1-butene random copolymer having a melting point of 66.5°C or less and having a crystallization rate (1/2 crystallization time) at 45°C of 10 minutes or less. The relevancy of this lack of disclosure in Kawai *et al.* '687 is apparent upon reviewing Figure 1 ("Correlation between Melting Point (°C) and  $T_{1/2}$  at 45°C (min.)") which is herein attached as support of Applicants' position. With regard to a propylene/1-butene random copolymer prepared with the use of a conventional metallocene catalyst as exemplified in Comparative Example 3 of the present specification (see starting at page 170), Figure 1 depicts a correlation between the melting point ( $T_m$ ) and crystallization rate (1/2 crystallization time) at 45°C ( $T_{1/2}$  at 45°C). As can be seen, there is a tendency such that the crystallization rate at 45°C rapidly lowers ( $T_{1/2}$  at 45°C becomes rapidly longer) with a decrease in melting point ( $T_m$ ).

Thus, though the Examiner is asserting a proper showing has not been done (see paragraph 4 of the Office Action), Applicants note that (1) Kawai *et al.* '687 fails to disclose the propylene/1-butene random copolymer having a melting point of 66.5°C or less and having a crystallization rate (1/2 crystallization time) at 45°C of 10 minutes or less as instantly claimed; and (2) Figure 1 shows what happens when there is a difference in melting point (and crystallization rate).

Further, because the crystallization rate at 45°C rapidly lowers ( $T_{1/2}$  at 45°C becomes rapidly longer) with a decrease in melting point ( $T_m$ ), a sheet or film formed from this propylene/1-butene random copolymer having a low melting point can have excellent heat-sealing properties due to its low melting point, but at the same the sheet or film has poor transparency due to its low crystallization rate in the low-melting region.

On the other hand, the propylene/1-butene random copolymer having a specific melting point of the present invention possesses the characteristic of an extremely high crystallization rate (i.e., a short  $1/2$  crystallization time), especially in the low-melting region for the rate of change of the melting point, as compared to the copolymer that is prepared by using a conventional metallocene catalyst. This is due to the decrease of the crystallization rate that is extremely low with the decrease of the melting point as shown in Fig. 1.

Because of the above-mentioned feature, and for the first time, a transparent sheet or film with low haze can be obtained without losing heat-sealability (due to the present invention's low melting point) by using the present invention's propylene/1-butene random copolymer.

Applicants also respectfully refer the Examiner to the two tables below. The above-mentioned effects are exemplified by comparing Inventive Example 3 with Comparative Example 3 as a copolymer (see Table A below), and comparing Inventive Example 3b with Comparative Example 4b (see Table B below) as a biaxially stretched film (see also Table 2 bridging pages 170-171 and Tables 5-1 and 5-2 bridging pages 177-178 of the specification).

**TABLE A**

	<b>1-Butene Content (mol%)</b>	<b>Melting Point (°C)</b>	<b>½ Crystallization Time (minutes)</b>
Example 3	28.0	66.5	5.2 (Present Invention)
Comparative Example 3	34.5	69.5	33.1 (Prepared with the use of a Conventional Metallocene Catalyst)

**TABLE B**

	<b>Haze (%)</b>	<b>Heat-Seal Strength (N/15mm) 65°C / 70°C / 80°C</b>
Example 3b	13.9	0.3 / 3.1 / 3.3 (Present Invention)
Comparative Example 4b	25.9	0.3 / 2.9 / 3.5 (Prepared with the use of a Conventional Metallocene Catalyst)

Table A shows a pronounced difference in crystallization time despite the small difference in melting point; Table B shows a pronounced difference in heat-seal strength. Therefore, even if the Examiner has hypothetically established a *prima facie* case of obviousness, a point not conceded by Applicants, the unexpectedly superior results according to the present invention rebut such a hypothetical *prima facie* case of obviousness.

Furthermore, though the Examiner asserts that the copolymer of the present invention can be expected from the Kawai *et al.* '687 embodiment and is thus obvious, Kawai *et al.* '687 does not specifically disclose or teach the propylene/1-butene random copolymer having a specific melting point of the present invention as explained above. Moreover, the cited Kawai *et al.* '687 reference fails to disclose or suggest the above superior (and unexpected) effects of the

present invention. That is, Kawai *et al.* '687 does not give any guidance to the skilled artisan to achieving the decrease of the crystallization rate that is extremely low with the decrease of the melting point, and furthermore to a sheet or film formed from the instantly claimed propylene/1-butene random copolymer having a specific melting point which has excellent transparency while maintaining an improved heat-sealability at low temperature.

As also relevant here, *Graham v. John Deere*, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), has provided the controlling framework for an obviousness analysis, wherein a proper analysis under § 103(a) requires consideration of the four *Graham* factors. One such factor includes the evaluation of any evidence of secondary considerations (e.g., commercial success; unexpected results). 383 U.S. at 17, 148 USPQ at 467. Applicants thus request reconsideration of the secondary consideration of unexpected results as discussed above (see the attached Figure 1 and the above shown Tables A-B).

Overall, Kawai *et al.* '687 does not teach or suggest present claim 1 and unexpected results can be obtained by the present invention as described above. Thus, at least pending claim 1 is allowable over the cited Kawai *et al.* '687 reference. Moreover, present claim 10 that depends from claim 1 and defines a polymerization catalyst to prepare a propylene/1-butene random copolymer of present claim 1 is also patentable for the same reasons above. Accordingly, Applicants respectfully request the Examiner to withdraw the rejection under 35 U.S.C. § 103(a) and allow the presently pending claims.

Favorable consideration of new claims 15-16 is also respectfully requested. These new claims depend on claim 1, wherein claim 1 is allowable as explained above.

**Conclusion**


A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Eugene T. Perez (Reg. No. 48,501) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By  #28,781  
Marc S. Weiner  
Registration No.: 32,181  
BIRCH, STEWART, KOLASCH & BIRCH, LLP  
8110 Gatehouse Road, Suite 100 East  
P.O. Box 747  
Falls Church, Virginia 22040-0747  
(703) 205-8000  
Attorney for Applicant

Attachment:

- Figure 1 : Correlation between Melting Point (°C) and T<sub>1/2</sub> at 45°C (min.)

**Fig. 1 Correlation between Melting Point (°C) and  
T<sub>1/2</sub> at 45°C (min.)**

